**Deforestation, Fragmentation, and the Edge Effect**

**Objectives**

At the conclusion of the lesson, the student will be able to:

* Explain the concepts of deforestation, edge effect, and fragmentation.
* Describe how these concepts negatively effect species populations and biodiversity.
* Show, through demonstration, how individual animals from the Osa Peninsula region of Costa Rica are affected by deforestation, defragmentation, and edge effect.

**Vocabulary**

* deforestation
* fragmentation
* edge effect

**Background**

Costa Rica is a leader in Latin America for setting aside 25% of its land for natural reserves. Clearly this was a bold step and has done much to preserve the diverse fauna in the country. The size of each preserve and its proximity to threats, however, are important in assessing the success of the wildlife in the preserves. In this lesson, students will explore the key terms and participate in an activity to demonstrate how deforestation, fragmentation, and habitat edges may affect native animal populations.

**Secondary Activity**

**Materials**

* Graph paper, colored pencils, scissors, [worksheet](http://www.sitesalive.com/crl/tg/private/crltgdeforest.pdf)

**Preparation**

* Photocopy worksheet

**Procedure**

1. Today we are going to learn three new concepts: deforestation, fragmentation, and the edge effect. Costa Rica set aside 25% of its land as natural reserve. This was a big step and has done much to preserve the diversity of flora and fauna in the country. But there is more to consider than just the quantity of land.
2. Pass out worksheet and graph paper. It is recommended that the first side of the worksheet be completed as a class to promote class discussion.
3. Ask students to cut out the park and animals from their graph paper, following the instructions on page two of the handout. Allow students to experiment with pieces on their own to draw conclusions about what will happen to the animals.
4. Discuss student observations as a class to reach consensus.

**Extension**

1. Research additional animals that live on Costa Rica’s Osa Peninsula. What land requirements do they have? How would they be affected by the various challenges?
2. Research development projects in your town. How has the new mall, housing development, or business center affected the local fauna? Have fragmentation and edge effect been created by this deforestation?

**NIE Activity**

Track the weather in your area for several days (either consecutively or weekly) at different locations. How does proximity to different ecosystems affect the weather in a region? For example, within a city or county, how does the temperature vary from downtown to the beach or lakeshore?

**Worksheet Answers**

1. Pasture and farm land, population growth (housing construction), roads, utility line corridors, logging, and hunting.
2. Any of the above!
3. Actual loss of habitat
4. Increase in edge effects as the size of the forest patch is reduced.
5. Increase isolation of patches that can lead to loss of gene flow and dispersal (individuals of same species are separated).
6. Strong gradients of light intensity
7. Temperature variation
8. Wind velocity
9. Relative humidity
10. List is exhaustive! Possible answers are: Loss of adequate habitat to support life, loss of adequate habitat to avoid predators, loss of food source, loss of biodiversity, increased exposure to the elements, and increased competition between native and introduced species.